

THAT WHICH IS CLAIMED:

1. A method of demodulating a received signal, the method comprising:  
providing an interference map containing information regarding a plurality of  
candidate interference sources;  
5 identifying any of the candidate interference sources that comprise a dominant  
interference source based on the received signal and the information regarding the plurality of  
candidate interference sources;  
demodulating the received signal to recover wanted information while compensating  
for interference with the aid of the information stored in the interference map.

10 2. The method of Claim 1, wherein providing an interference map containing  
information regarding a plurality of candidate interference sources comprises:  
identifying a plurality of candidate interference sources;  
generating information regarding the identified candidate interference sources;  
storing the generated information in the interference map.

15 3. The method of Claim 1, wherein identifying any of the candidate interference  
sources that comprise a dominant interference source based on the received signal and the  
information regarding the plurality of candidate interference sources comprises:  
generating a plurality of classification measures associated with a plurality of  
interference scenarios,  
20 identifying as dominant interference sources any candidate interference sources  
associated with the interference scenario which the classification measures indicate is the  
most likely interference scenario.

25 4. The method of Claim 3 wherein each classification measure is based on the  
difference between the received signal and an expected received signal for one of the  
plurality of interference scenarios.

5. The method of Claim 1, wherein demodulating the received signal to recover  
wanted information while compensating for interference with the aid of the information  
stored in the interference map comprises jointly demodulating a desired carrier and any  
identified dominant interference source.

30 6. The method of Claim 3, wherein the method further comprises:

estimating updated information regarding any identified dominant interference source based on information uncovered regarding any identified dominant interference sources during demodulation of the received signal; and  
storing the updated information in the interference map.

5           7.       The method of Claim 1, wherein the method further comprises:

determining a position where the received signal is received;

determining a position associated with at least one of the plurality of candidate interference sources;

10           estimating updated information regarding the at least one of the plurality of candidate interference sources based on the position where the received signal is received and the position associated with the at least one candidate interference source; and  
storing the estimated updated information in the interference map.

8.       The method of Claim 1, wherein the method further comprises:

determining a position where the received signal is received;

15           storing the information regarding the plurality of interference sources in the interference map along with the determined position; and

updating the interference map with the stored information regarding the plurality of interference sources when it is determined that the wireless terminal is within a specified distance from the determined position.

20           9.       The method of Claim 1, wherein the method further comprises:

identifying a candidate interference source in the interference map that has been inactive for a specified period; and

removing the information associated with the inactive candidate interference source from the interference map.

25           10.      The method of Claim 1, wherein the method further comprises:

identifying a new candidate interference source that is not one of the plurality of candidate interference sources included in the interference map;

generating information regarding the identified new candidate interference source;

and

30           storing the generated information in the interference map.

11. The method of Claim 1, wherein the information regarding the plurality of candidate interference sources includes information regarding a relative timing of a desired signal and at least one of the candidate interference sources.

12. The method of Claim 1, wherein the method further comprises:  
5 identifying two or more entries in the interference map correspond to a single candidate interference source; and  
merging the two or more identified entries into a single entry.

13. The method of Claim 3, wherein the interference scenario having no dominant interference sources is identified as the most likely interference scenario if it is determined  
10 that none of the classification measures are less than a specified value.

14. The method of Claim 1, wherein the method further comprises:  
error correction decoding the demodulated received signal to provide an estimate of a desired signal;  
processing the received signal to determine parameters associated with at least one  
15 interference source; and  
storing the determined parameters in the interference map.

15. The method of Claim 14, wherein processing the received signal to determine parameters associated with at least one interference source is only performed if the error correction decoding indicates the desired signal was correctly received.

16. The method of Claim 14, wherein processing the received signal to determine parameters associated with at least one interference source is performed using background processing.

17. A method of demodulating a received signal that includes a desired signal, a signal received from a co-channel interference source and noise, the method comprising:  
25 identifying a plurality of candidate co-channel interference sources, wherein the signal received from the co-channel interference source is received from one of the identified plurality of co-channel interference sources;  
generating information regarding the identified co-channel interference sources;  
storing the generated information in an interference map;  
30 selecting one of the candidate interference sources for cancellation from the received

signal based on the received signal and the stored information regarding the identified co-channel interference sources;

canceling at least part of the signal received from a co-channel interference source during demodulation of the received signal.

5           18.     The method of Claim 17, wherein the candidate interference source selected for cancellation is selected by:

generating a plurality of classification measures associated with a plurality of interference scenarios,

10           identifying as a dominant interference source the candidate interference source associated with the interference scenario which the classification measures indicate is the most likely interference scenario and selecting the identified dominant interference source for cancellation.

15           19.     The method of Claim 18, wherein each classification measure is based on the difference between the received signal and an expected received signal for one of the plurality of interference scenarios.

20           20.     The method of Claim 17, wherein the method further comprises:

estimating updated information regarding the co-channel interference source selected for cancellation based on information uncovered regarding the co-channel interference source selected for cancellation during demodulation of the received signal; and

storing the updated information in the interference map.

21.     The method of Claim 20, wherein the method further comprises:

determining the position where the received signal was received and the position of at least one of the plurality of candidate interference sources; and

25           estimating updated information regarding the at least one of the plurality of candidate interference sources based on the relative positions at which the received signal was received and the at least one candidate interference sources; and

storing the estimated updated information in the interference map.

22.     A method of demodulating a received signal, the method comprising:

identifying any dominant co-channel interference component in the received signal;

30           classifying the interference scenario associated with the received signal based on the results of the identifying step;

selecting a demodulation algorithm based on the interference scenario classification;  
and  
demodulating the received signal according to the selected demodulation algorithm.

23. The method of Claim 22, wherein the method further comprises providing an  
interference map containing information regarding a plurality of candidate interference  
sources, and wherein information from the interference map is used in demodulating the  
received signal in cases where the interference scenario associated with the received signal  
includes a dominant cochannel interference source.

24. The method of Claim 22, wherein selecting a demodulation algorithm  
comprises selecting a single-user demodulation algorithm if no dominant co-channel  
interference source is identified and wherein selecting a demodulation algorithm comprises  
selecting a joint-demodulation algorithm if a single dominant interference source is  
identified.

25. The method of Claim 23, wherein information from the interference map is  
used in classifying the interference scenario.

26. A system for demodulating a received signal, comprising:  
an interference map containing information regarding a plurality of candidate  
interference sources;  
a classification circuit for classifying an interference scenario associated with the  
received signal based on the received signal and the information regarding the plurality of  
candidate interference sources;  
a control circuit that specifies a demodulation algorithm based on the classified  
interference scenario; and  
a demodulator that demodulates the received signal according to the specified  
demodulation algorithm.

27. The system of Claim 26, wherein the controller selects a single user  
demodulation algorithm for classified interference scenarios having no dominant interference  
source.

28. The system of Claim 26, wherein the controller selects a joint-demodulation  
algorithm for classified interference scenarios having a single dominant interference source.

29. The system of Claim 26, wherein the system further comprises:

a feature classification circuit that identifies candidate co-channel interference sources and provides information regarding identified candidate co-channel interference sources to the interference map.

5 30. The system of Claim 26, wherein the system further comprises an update system, wherein the update system updates the information stored in the interference map based on the output of the demodulator.

31. A system for demodulating a received signal, comprising:

10 means for providing an interference map containing information regarding a plurality of candidate interference sources;

means for identifying any of the candidate interference sources that comprise a dominant interference source based on the received signal and the information regarding the plurality of candidate interference sources; and

15 means for demodulating the received signal while canceling at least part of the contribution of any identified dominant interference source.

32. The system of Claim 31, wherein the means for identifying any of the candidate interference sources that comprise a dominant interference source comprises;

20 means for generating a plurality of classification measures associated with a plurality of interference scenarios; and

means for identifying as dominant interference sources any candidate interference sources associated with the interference scenario which the classification measures indicate is the most likely interference scenario.

33. A method of demodulating a received signal, the method comprising:

25 providing an interference map containing information regarding a plurality of candidate interference sources;

identifying one of the candidate interference sources that comprises a dominant interference source based on the received signal and the information regarding the plurality of candidate interference sources;

30 demodulating the received signal while canceling at least part of the contribution of the identified dominant interference source using at least some of the information regarding the identified interference source contained in the interference map.

34. The method of Claim 33, wherein identifying one of the candidate interference sources that comprises a dominant interference source based on the received signal and the information regarding the plurality of candidate interference sources comprises:

generating a plurality of classification measures associated with a plurality of interference scenarios,

identifying the dominant interference source based on the classification measures associated with the plurality of interference scenarios.

35. The method of Claim 34, wherein identifying the dominant interference source based on the classification measures associated with the plurality of interference sources comprises identifying as the dominant interference source the candidate interference source associated with an interference scenario from the plurality of interference scenarios having the lowest classification measure.

36. The method of Claim 1, wherein demodulating the received signal to recover wanted information while compensating for interference with the aid of the information stored in the interference map comprises subtracting out of the received signal known symbols transmitted by the identified dominant interference source.

37. The method of Claim 36, wherein the known symbols subtracted out of the received signal are weighted by channel estimates before the subtraction is performed.